

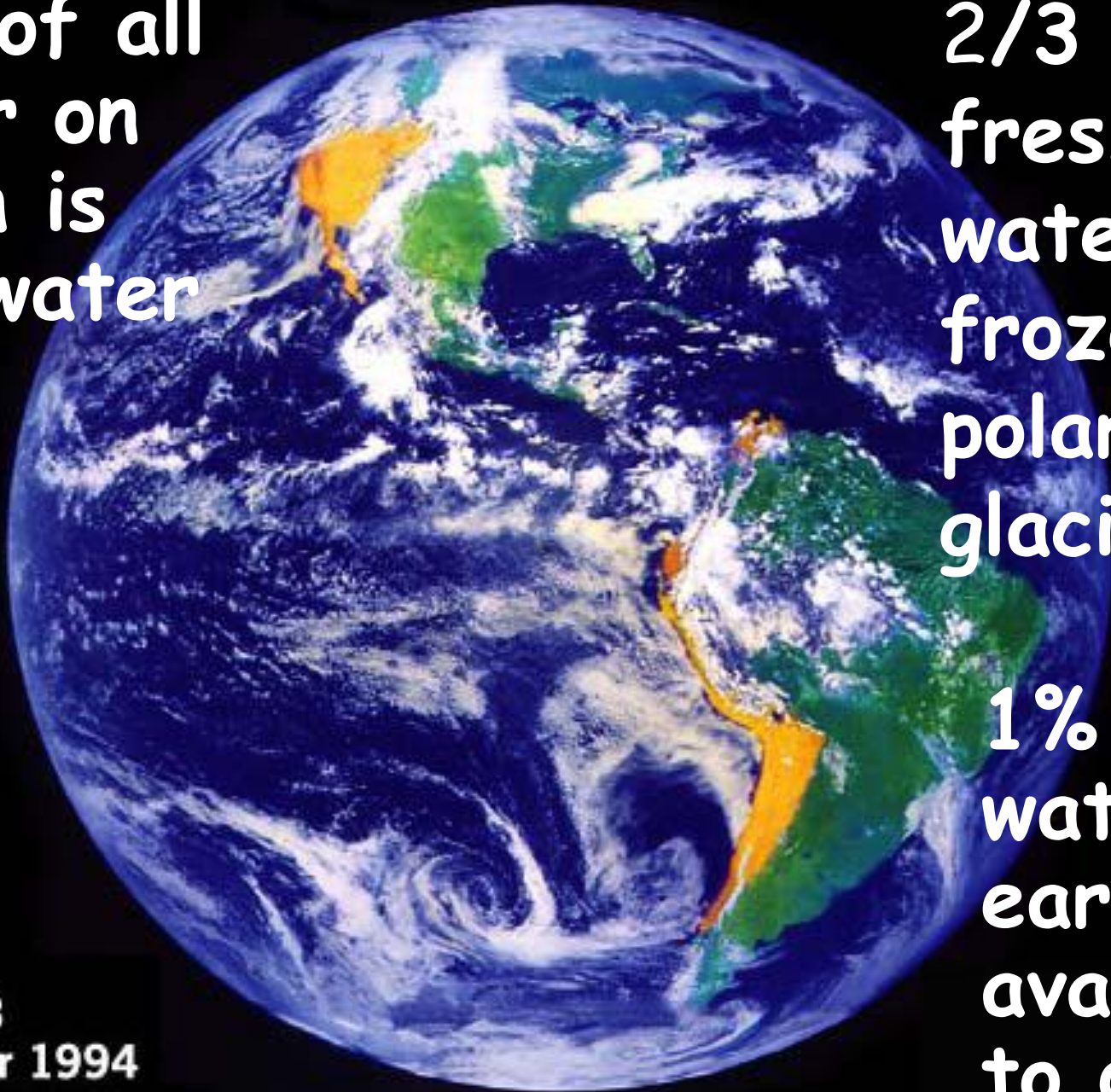
# Watering Efficiently



97% of all  
water on  
earth is  
salt water

2/3 of all  
fresh  
water is  
frozen in  
polar and  
glacial ice

1% of all  
water on  
earth is  
available  
to drink



Satellite  
GOES 8  
September 1994

**"I believe water is the biggest environmental issue we face in the 21st century in terms of both quantity and quality."**



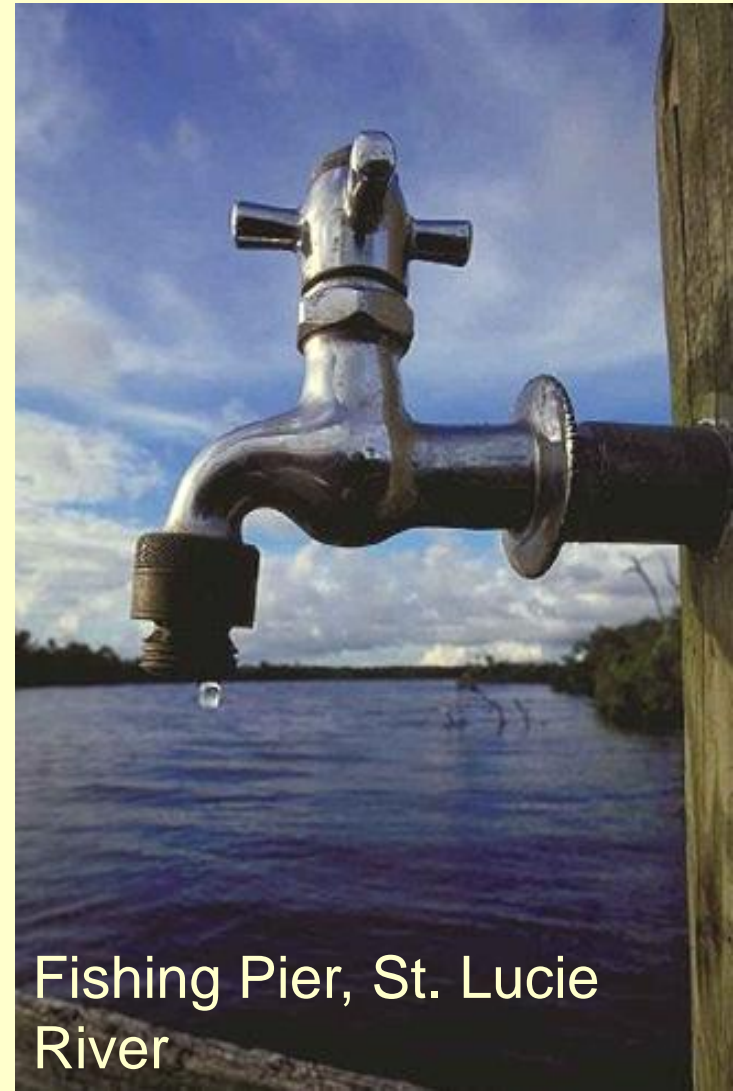
**Christie Todd Whitman**  
**EPA Administrator**



# Domestic Water Use

- American water use is high compared to other nations
- Twice European use
- Partly due to irrigation of lawns and landscapes

USGS, 1998



Fishing Pier, St. Lucie  
River

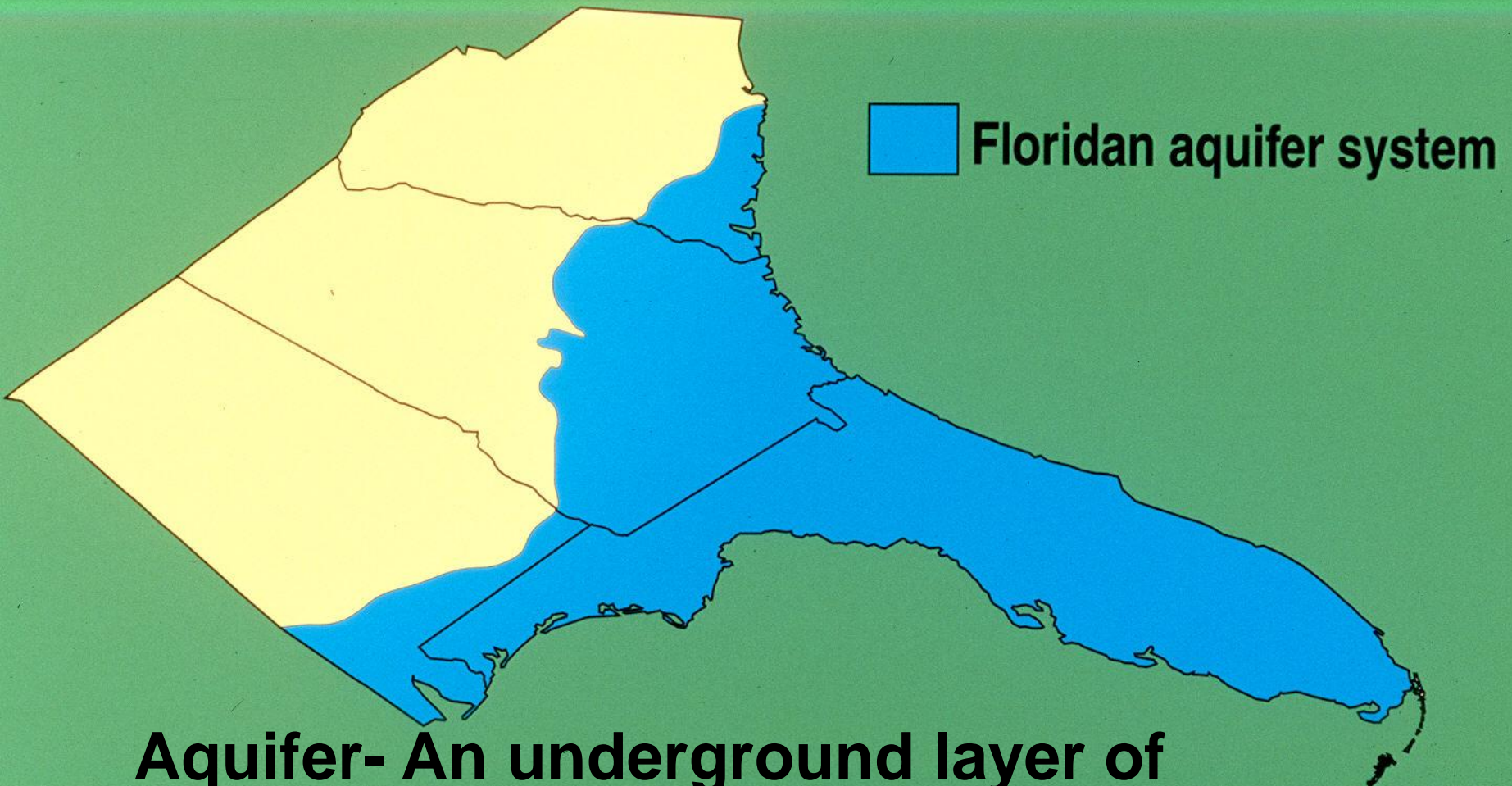
# American Water Use

- Consumption in the U.S. is about 370 gallons/person/day.
- 80 gallons/person/day of residential use
- 290 gallons/day of agriculture and industry use





# Where does it come from?



**Aquifer-** An underground layer of limestone that stores and carries water.



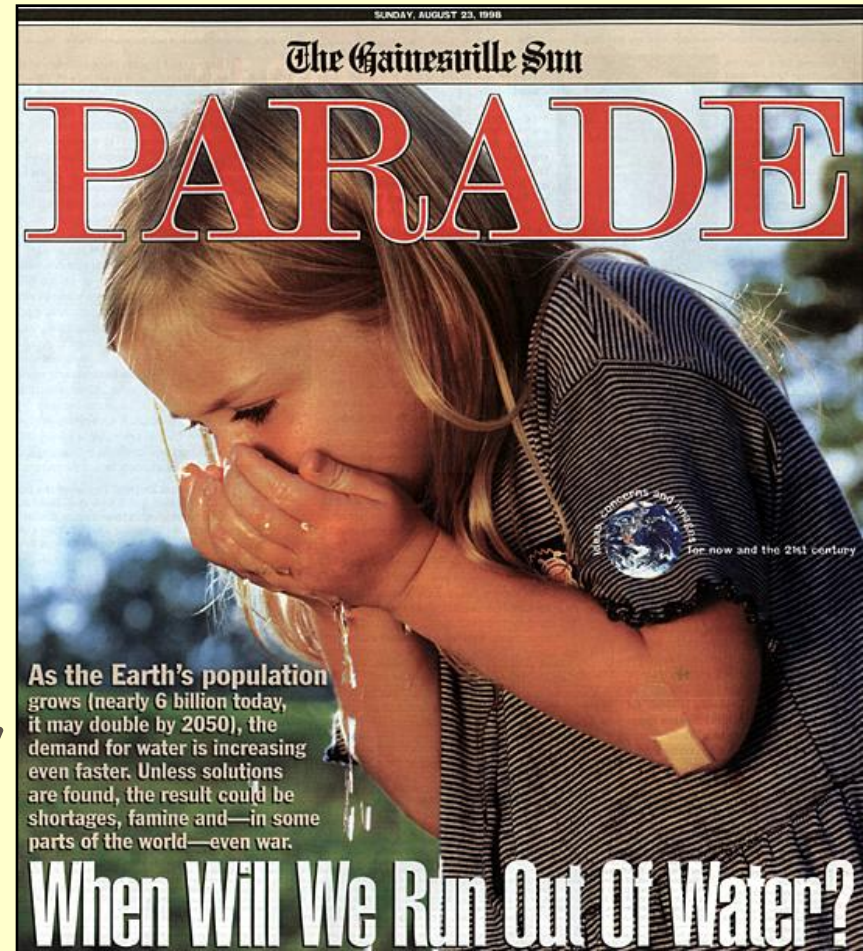
# Mining Ground Water

- Groundwater resources are depleted when water is withdrawn faster than replenished.
  - Over pumping
  - Drought reduces recharge
  - Salt water intrusion is also a concern



# H<sub>2</sub>O sustains life on earth!

- Under ideal conditions, an adult can live for **over a month** without food, but only **10 days** without water
- Population is increasing, but water is not





# Plants Need Water Too...

- For cell growth and expansion
- For plant metabolism
- Transporting soil minerals to roots.
- Physical support through turgor pressure
- Transporting sugars within the plant
- Cooling through transpiration



# What Can I Do?

Design a water efficient landscape:

- Right plant, right place
- Choose natives or low maintenance plants
- Group plants according to their water needs
- Use mulch







# Water Use Efficiency

## Controllable Factors

- Plant selection
- Plant placement
- Soil structure
- Mulching
- Irrigation
- Maintenance practices
- Human Tolerance
- Education

## Uncontrollable Factors

- Temperature
- Precipitation
- Sunlight
- Wind
- Soil texture
- Drainage
- Water quality
- Local water restrictions



# Landscaped Beds or Lawn?

Depending upon location, lawns need 20 to 35 inches of irrigation water\* per year while most woody plants in mulched areas require approximately 10 inches\*.

\*In addition to 50+ inches rainwater/year

U.F. Circular EH 320; 1993

1 inch of water/ 1,000 ft<sup>2</sup> = 624 gallons

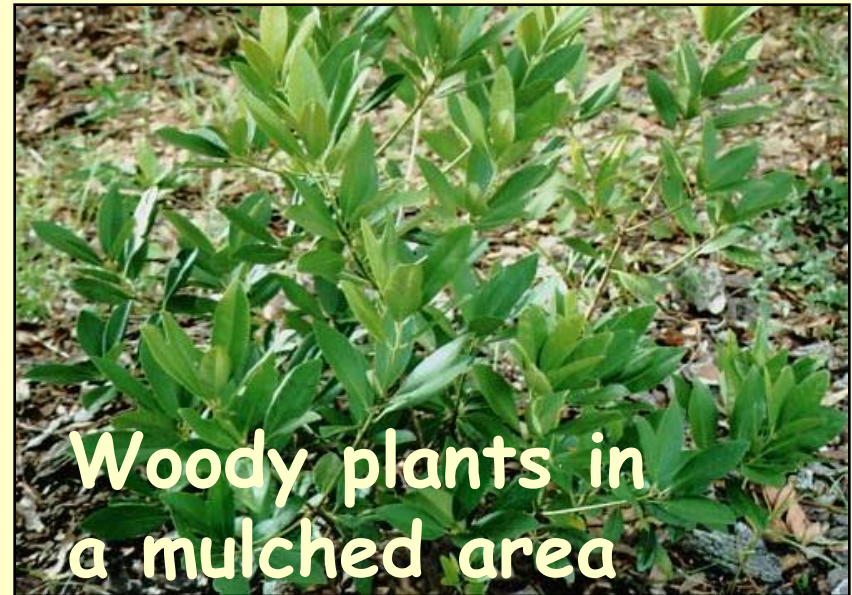
International Turf Producers Foundation

Based on these numbers, 1,000 ft<sup>2</sup> of:



Grass

requires 12,480 – 21,840 gallons of irrigation water/year.



Woody plants in a mulched area

require 6,240 gallons irrigation water/year.

Woody landscapes can conserve up to 15,600 gallons of irrigation water/year.



# Functional Turf Areas

- Berms and Swales
  - Help to diminish pollutants and stormwater run-off
- Recreational areas
  - Turf is resistant to foot traffic, and reduces temperature, glare, noise, and dust
- Pet areas



# Functional Landscaped Beds

Annuals, perennials, ground covers, shrubs or trees in a mulched area, to...

- screen a view
- cover oddly-shaped areas difficult to mow or irrigate
- plant a shady area where turf won't grow
- provide a buffer for stream banks
- provide color, shade, or windbreak





# Drought Tolerant Turf

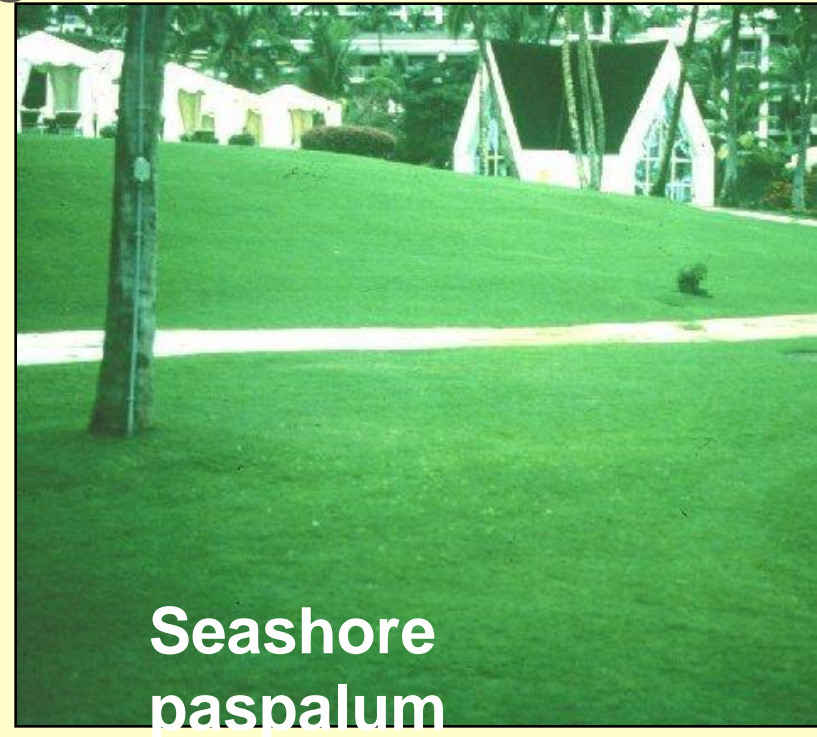
- Select drought tolerant turf varieties.
  - When establishing a new lawn, sod requires less water than seeding.
- Follow maintenance guidelines to promote drought tolerance.
  - During extreme drought, many turf species enter dormancy, ceasing growth and turning golden brown. Very little water is required to keep the turf alive and turf recovers quickly once irrigation is resumed.



# Selecting Drought Tolerant Turf

## Seashore paspalum 'SeaIsle

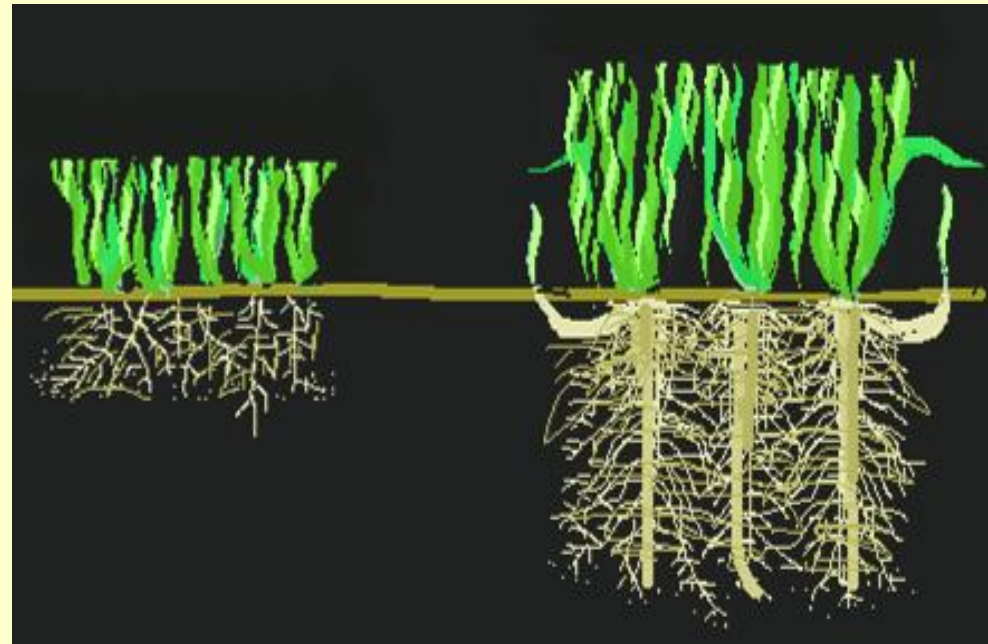
- Excellent drought tolerance
- Excellent salt tolerance
- Fine, dense, dark green
- Disease and pest resistant
- Tolerates flooding and some shade
- Moderate thatch
- Mow at 1.5 - 2 inches in height



Seashore  
paspalum

# Maintenance Guidelines for Drought Tolerant Turf

- Never mow grass needing water.
- Never mow wet grass.
- Keep blade sharp.
  - Clean cuts heal quickly and reduce water loss.
- Mow lawn at the highest setting.
  - Taller grass has deeper, more extensive roots.





# Turfgrass Maintenance

- Fertilize conservatively
  - Use Clemson Extension guidelines
  - Rapid growth promotes thatch build-up.
- Remove thatch
  - Thatch restricts water movement.
  - Use a stiff rake or coring tool to aerate the soil.





# Landscape Maintenance

- 2-3 inches of mulch in plant beds
  - improves water infiltration.
  - reduces storm water runoff.
  - reduces evaporation.
  - prevents erosion.
  - controls weeds.



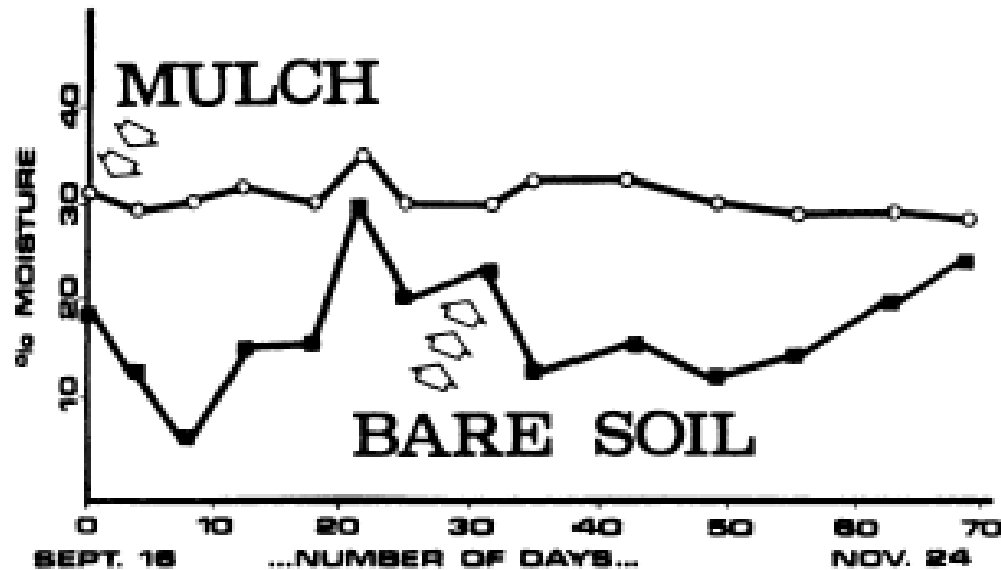


Figure 18. Moisture level of mulched vs. bare soil



# When Do I Water?

- Early morning or evening?
  - Temperature is cool and wind is calm
  - 40% - 60% of water applied evaporates in the afternoon sun!
  - BJWSA Needs all the water they can pump between 5-7 AM!!!
  - Drip systems can be run anytime during the day
  - Early evening is the worst time for the plant.....with overhead irrigation
  - Water on the leaves for an extended period provides perfect environment for disease spores



# How Much?

- Apply  $\frac{1}{2}$  to  $\frac{3}{4}$  inch water per application.
- Soak soil thoroughly to promote a deeper, more drought tolerant root system.



Efficient watering wets only the root zone.

# Measure It

- Use several rain gauges, *or...*



- 1) Place cans of equal diameter in random places underneath the sprinkler's spray pattern
- 2) Measure the depth of water in each can
- 3) Average the depths

**Determine the length of time it takes for your sprinkler system to deliver 1/2 to 3/4 inch water.**



# How Often?

- Water “as needed,” not routinely!
- Less frequently in the fall and winter.
- Check with your water supplier about water restrictions during drought.



Typically, our rainy season is June - September.



# Watering Tips



**Wilting azalea**

- Learn to recognize when plants *need* water
- In the heat of midday, some plants wilt. No amount of water will change this. If the plant is still wilted by evening, water it then.

# Water "As Needed"



Folded leaflets, a blue color, and footprints that remain on the lawn are indications of a lawn that needs water.



# Too much of a good thing?

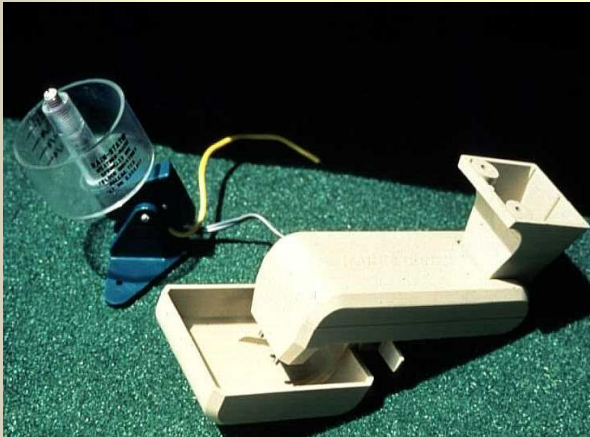
- Over watering occurs when water is applied too frequently or in excessive amounts.
  - Encourages growth of fungi and bacteria
  - Promotes a shallow root system
  - Reduces oxygen to the roots, causing stress
  - Encourages weed growth



**Dollarweed is a good indication of an over watered lawn.**



# Efficient Irrigation System



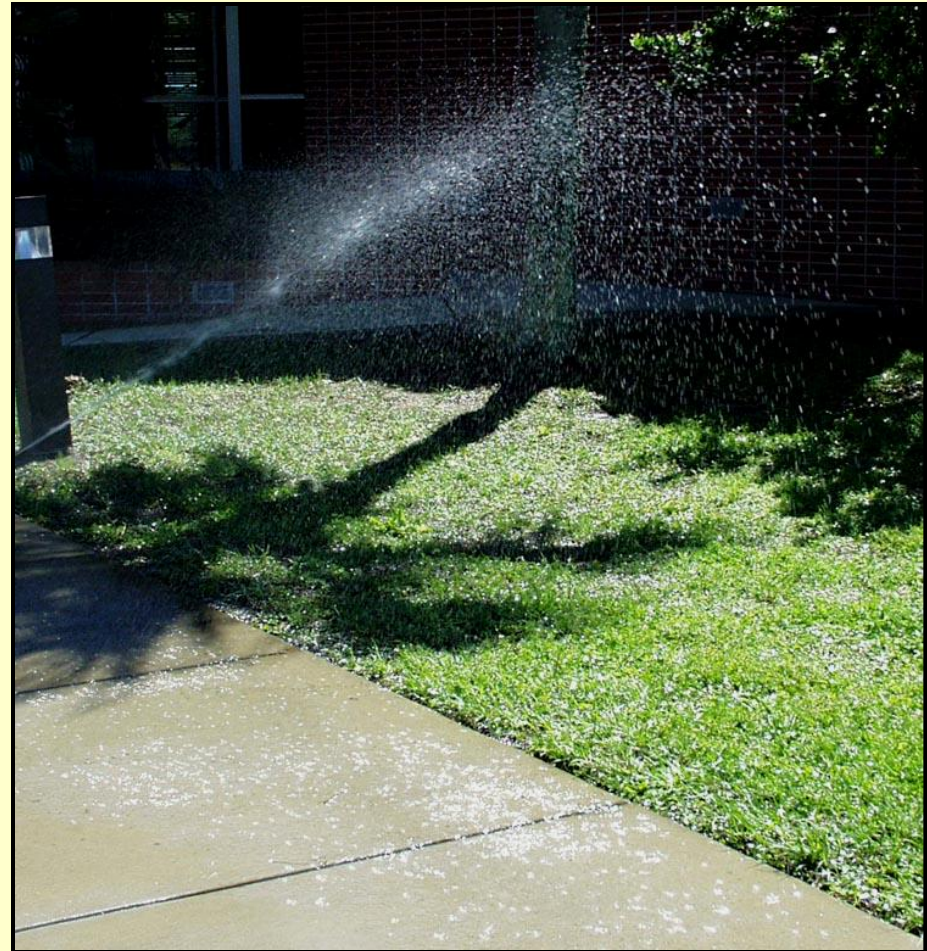
Rain Shut-off Device

Many local codes  
require these!!!

- Calibrate the sprinkler system...Know how much water you are applying!!
- Install a rain shut-off device
- Have your sprinkler system "tuned up" yearly
- Replace worn hose and faucet washers.

# Efficient Irrigation

- Separate lawn zones from landscape zones
- Convert landscape beds to drip or low volume irrigation
- Adjust sprinklers to avoid wasting water on sidewalks and streets



# Inspect Your System Regularly

- Manually operate each zone.....  
do a visual check
- Look for abnormal sprinkler patterns
- "Geysers" and "bubblers" need checking
- Puddling anywhere or lots of fresh sand may mean broken pipes or heads





# Low Volume Sprinklers



**Micro-jet sprinkler**



**Drip emitters**

Micro-irrigation can improve watering efficiency.

# Tips on Conserving Water

- Use recycled or gray water to irrigate.
  - From showers or washing machines, but not toilets
- Direct downspouts toward beds or lawn.
- Cover pools and hot tubs to prevent evaporation.





# Rain Barrels

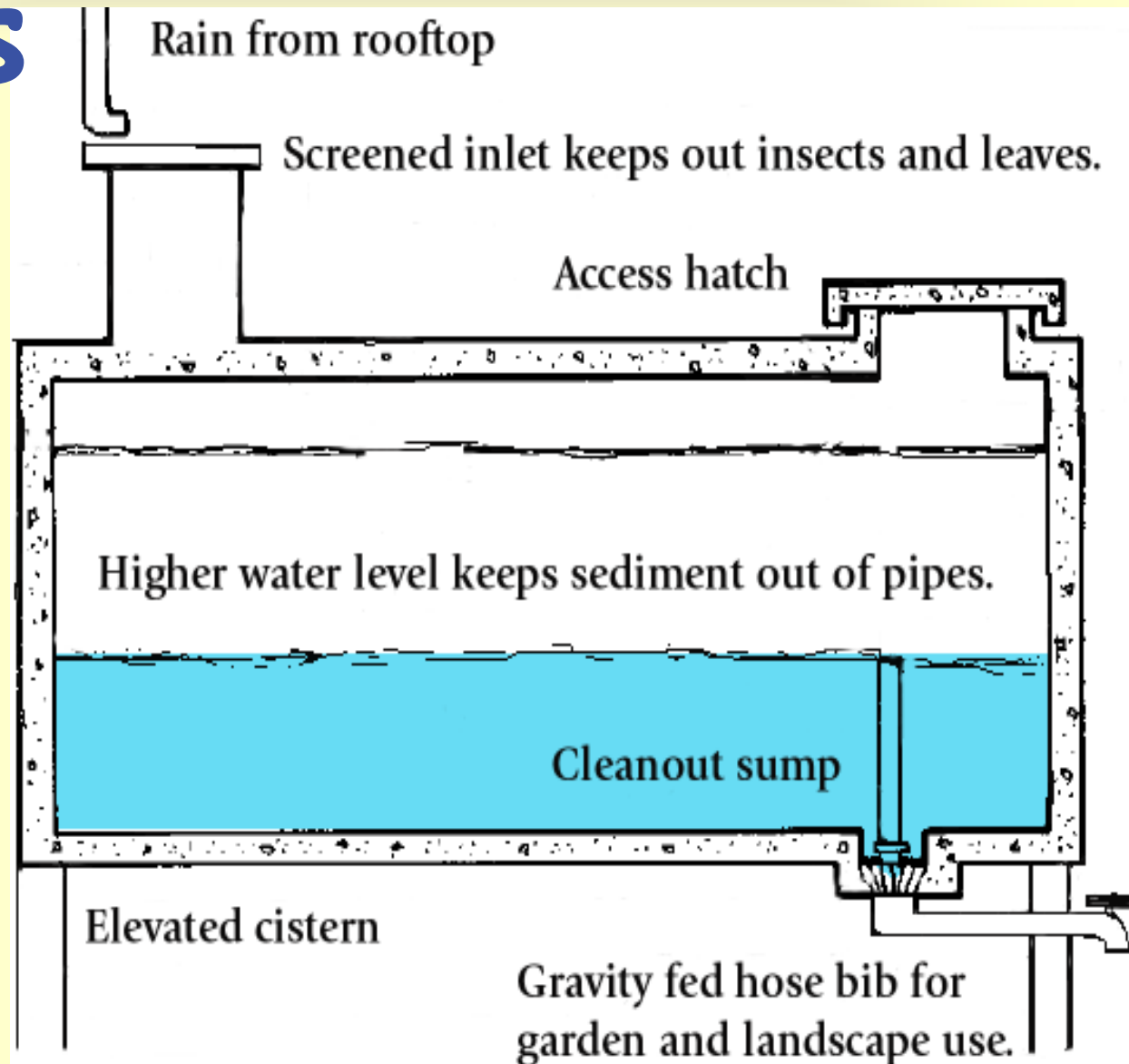


- Collect and harvest rain water for irrigation purposes.
- Rainwater runs off roof into the barrel from the downspout.
- A screen fastened over the inlet prevents leaves or insects from entering.



# Cisterns

- Imply greater storage capacity and a bit more engineering.
- Water travels by gravity or pump action.



# Thank You!!

*Developed by: Joe Sowards  
Edited by: Rebecca McNair and  
Christine Kelly-Begazo,  
State Coordinator, FYN  
University of Florida- IFAS  
Used with permission*



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# Less Is More

- Laura Lee Rose
- Clemson Extension Horticulture Agent







# Need to understand

- Soils
- Plant Growth
- Light
- Temperature or Zone
- Moisture
- I D Pests
- Proper Control Techniques
- Fertilize Correctly
- Pruning Techniques
- Mowing Height
- Good Sanitation





# Soil Testing

- Gives the pH and nutrients available for plant growth
- Specific recommendations for homeowner
- Time and amount of fertilizers to be applied
- Avoids the over-application of fertilizer
- Saves money
- Prevents run off into estuary



# Plant Problem Clinic

- Ornamentals
- Weeds
- Insects
- Disease
- Recommendations for treatment







# Use Drought Tolerant Plants

## Xeriscape Principles

- Group plants according to water requirements
- Many native plants can handle drought
- Mulch
- Mass plant material
- Plan and manage for water conservation



# Reduce, Reuse, Recycle





# Compost needs to happen



Americans throw out 1,200 pounds of organic garbage







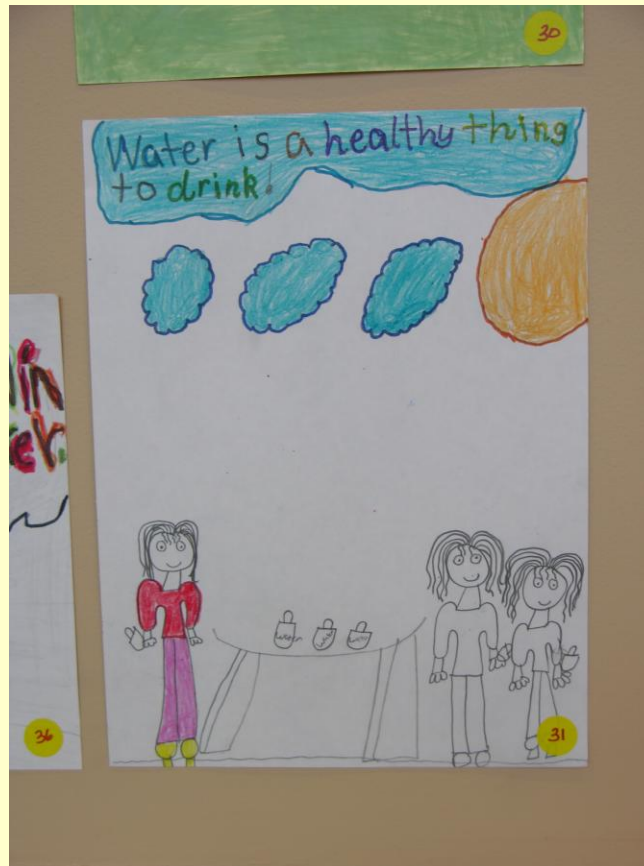




# Rain barrels and harvesting



4 of every 100 gallons used a day in the United States is necessary



Protect habitats





# H<sub>2</sub>O...What you need to know



Do Not litter in Rivers!!

BE Good  
People  
AND

No  
littering!!

HELP KEEP RIVERS CLEAN!!



Good  
track



# Gardening and Sustainable Agriculture





# Farmers Markets and Locavores








Gardening is therapeutic





NOTE: For those of you not familiar with the term "locavore": A locavore is someone who eats food grown or produced locally or within a certain radius such as 50, 100, or 150 miles. The locavore movement encourages consumers to buy from farmers' markets or even to produce their own food, with the argument that fresh, local products are more nutritious and taste better.

Locally grown food is an environmentally friendly means of obtaining food, since supermarkets that import their food use more fossil fuels and











**Gotta Go!**